Key Skills and Attributes Desired of Undergraduate Business Hires

UNDERGRADUATE RESEARCH THESIS

Presented in Fulfillment of the Requirements for the Honors Research Distinction in the Fisher College of Business at The Ohio State University

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Abstract

Job candidates spend time considering what qualities they should market to potential employers. There is a fair amount of research surrounding Key Skills and Attributes (KSA) businesses look for when hiring MBA graduates, however, this research is lacking at the undergraduate level. This project will expand upon the existing research by focusing specifically on jobs being filled by undergraduates. To this end, this project explores KSAs employers look for in recent undergraduate business potential hires, and how those hiring goals differ between employers by industry. This was accomplished by compiling job descriptions posted in FisherConnect, the Fisher College of Business' recruiting platform, and applying text analysis, utilizing current tools like Voyant and Textio to identify the frequency of each KSA. Preliminary results indicate that **Computer and Analytical** skills are the most commonly asked for hard skills, while **Leadership and Initiative** are the most commonly asked for essential, or soft, skills. These results are in line with what researchers have found at the graduate MBA level. These insights are invaluable to undergraduate business students who are attempting to market themselves with resumes and employer interviews. In addition, business colleges can use the desired KSAs to modify or reinforce curricula. Finally, employers can see if their job postings are reflecting company needs and desires for specific KSAs.

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2) Introduction and Stakeholder Analysis

There is a fair amount of research that exists surrounding what businesses look for when hiring MBA graduates. Not as much research exists, however, studying hires at the undergraduate level. This project aims to expand upon the existing research and focus specifically on undergraduates. The main product of this research is to be a list of the most critical skills and attributes sought out by employers in their hires.

There are several stakeholders that stand to gain from this project. First, the students enrolled at the Fisher College of Business or anyone hoping to get a job in business post-graduation would benefit greatly from knowing the most important skills that employers want from them. With this knowledge, undergraduates can design their curriculum to ensure that they are gaining these necessary skills, and learn to highlight these skills and attributes in their resumes, cover letters, and in interviews.

Administrators in the FCOB stand to benefit from this information. By understanding what employers want from their undergraduate students, administrators can adjust curriculum and promote the acquisition of these skills to improve the employability of their students.

Potential obstacles to this project center around data. While data from Fisher Connect is accessible, there is uncertainty surrounding the condition of the data when it is obtained. For instance, it is possible that instead of full postings, the output from Fisher Connect

will instead include hyperlinks to company websites to the postings. Or, it is possible that if postings are transcribed by FCOB employees to be posted on Fisher Connect the integrity of the original post is not maintained. These challenges will be mitigated by obtaining preliminary data outside of the date range of this study to examine the expected condition of the data. Methodology may be adjusted accordingly. The data to be used in this study will be collected at the end of August/beginning of September and the date range of this study will be July 2017-September 2017 to reflect postings in the Fall 2017 hiring cycle.

3) Objective(s)/ Research Question

The purpose of this study is to determine the critical soft and hard skills that employers want from their undergraduate business new hires through an examination of job postings so that:

a) students can better understand how to market themselves to employers
b) employers can learn how well their job postings reflect what their hiring goals are
c) the university can promote these skills in curricula to improve the employability of graduating business undergraduates.

Which competencies are most significant to the performance of business positions as experienced and perceived by employers?

4) Prior Research

Most previous research in this area focus on one of two methodologies: (1) collecting survey data from employers asking about the importance of different attributes in job candidates, or (2) an analysis of job postings.

Below is a table summarizing the relevant literature, the methodology used for each study (either survey or job posting analysis), and the key skills identified in the eyes of employers.

Study	Methodology	Preferred Skills and Abilities
Davison (1993)	Survey	Eleven areas of greatest satisfaction with new hires among employers: punctuality, honesty, professional grooming, ethical behavior, dependability, willingness to work hard, commitment to lifelong learning, pride in work, ability to get along with others, sound academic training, and good work habits. Five areas of dissatisfaction: desktop publishing background, realistic expectations about advancement and starting salary, a strong computer background, and writing effectiveness.
Raymond (1993)	Survey	Oral skills, dependability, interpersonal skills, written skills, self-

		starter, motivation, enthusiasm, meets deadlines, quantitative skills, functional skills, work experience.
Aiken (1994)	Survey	The most important skill was determined to be the ability to communicate and get along with others. Practical business knowledge is valued more than theoretical knowledge. Computer and math skills are valued less than personal qualities such as leadership, dependability, and creativity. "Total quality management" is considered to be important, but the "globalization of curriculum" and "foreign languages" are not*. **Note the year in which this study was published.*
Tanyel (1999)	Survey	In descending order: responsibility and accountability, ethical values, interpersonal skills, oral communications, time management and punctuality, ability to work in

		teams, decision making and analytical ability, written communication, creativity, ability to assimilate new technology, project management, presentation skills.
Bennet (2002)	Job Posting Analysis	In descending order: communication, IT, organization, teamwork, interpersonal, motivation, analytical, self-confidence, numerical, initiative, presentation, foreign language, leadership, adaptability.
Robles (2012)	Survey	Integrity, communication, courtesy, responsibility, social skills, positive attitude, professionalism, flexibility, teamwork, and work ethic.
Shuayto (2013)	Survey	Responsibility, accountability, interpersonal skills, oral communication, teamwork, ethical values, decision making and analytical skills, and creativity and critical thinking.
Iyengar (2015)	Other	In descending order: oral communication, listening skills,

		written communication, presentation skills, adaptability, integrity, ability to value opinions of others, drive, cross-cultural sensitivity, ability to follow a leader, quantitative analysis, qualitative analysis, negotiation skills, core business knowledge, innovation and creativity, ability to inspire others, strategic vision, delegation skills, technology, specific language skills, managing decision-making process, managing task environment, managing strategy and innovation, managing human capital, managing administrative activities.

The job-type breakdown outlined in Figure 2 will be taken from that used in the Bennet 2002 study. The methodology from the first phase of Bennet's 2002 study will be applied to analyze the job postings, while this study will use a slightly less-formal methodology of confirming with employers than did Bennet's study.

5) Methodology

There are two main components of analysis for each job posting: how it was written and overall tone (Textio analysis), and the content (skills analysis).

Data: Data was collected from Fisher Connect. FisherConnect houses every job posting made by any company or organization aimed at business students as part of the Fisher College of Business recruiting season. FisherConnect collects data on employers, job description, job requirements, degree level, among other variables less relevant to this study. These job descriptions can be text analyzed to look for these key skills and attributes that will help highlight those that are most desired by employers of undergraduate students. Data was pulled for all posts put on FisherConnect from July-September 2017—yielding a raw data set with N=797. The data was cleaned by eliminating any postings that required graduate degrees, were incomplete, or were duplicates of other posts in the set. Data was collected for all positions posted from July 2017-September 2017, yielding a dataset of 666 unique postings.

Data is segmented by employer industry (Figure 2)**.**

Content Analysis: Content analysis was performed using the raw data and Microsoft Excel. Each posting was analyzed for mentions of a list of Key Skills and Attributes (KSAs) adapted from the 9 Key Characteristics and Attributes published by Porter and McKibbin's 1988 study (Figure 3). For each attribute exists a list of indicator words that will signify that an employer is asking for that attribute when the indicator word is used in a posting (Figures 4 and 5). The process of finding and assigning these indicator words

is as follows. The Context Tool in Voyer, a text analytics tool, was used to take the terms with the highest frequency of mentions and extract the language used to talk about the Key Characteristics. Stopwords were also used (Figure 6), which were identified by Voyer and frequencies of these words were not recorded throughout the dataset. Those words were then assigned to specific attributes at the discretion of the researcher. Through this process indicator words were assigned to each skill.

The postings were then analyzed in Microsoft Excel to count the frequency of each indicator word, and, more generally, the number of instances each key skill is mentioned in the sample. From these numbers an analysis of the most commonly asked for skills and attributes across all undergraduate business majors, and further broken down by employer industry, was conducted.

The unsegmented analysis in Excel was conducted using a series of COUNTIFF functions to count the frequency of each indicator word within the entire body of job postings. The sums of these indicator words were then tallied for each Key Characteristic to find the number of times each of the Key Characteristics was explicitly mentioned in the postings. From this information, insights like "15% of the skills asked for in the data set are for analytical skills."

The segmented analysis included the same procedure except referenced smaller, deliberately pulled datasets containing only postings within each specific industry.

Textio: Textio is an augmented writing platform meant to analyze job postings. Using the Textio algorithm, the research team was able to glean information in a representative

sample of the dataset about gender biases present in the postings as well as identify actionable areas for improvement.

A representative sample was calculated using the following formula:

$$Necessary\ sample\ size = \frac{(z-score)z-score^2 \times stdev \times (1-stdev)}{Margin\ of\ error^2}$$

Using a 90% confidence interval, a 0.5 standard deviation, and a z-score of 1.645, a representative sample size of 67 postings was calculated. Using this sample, postings were pulled at random using Microsoft Exel and run through the Textio platform to reveal insights discussed below.

6) Data

The original dataset contained 796 unique postings. To clean the data, all blank or non-undergraduate postings were deleted. Both internship and full-time positions were included.

After cleaning, the dataset that was used for analysis contains 665 unique postings.

Analysis was conducted on the dataset as a whole and unsegmented, as well as segmented by industry type.

A random sample of 67 postings from the dataset was used for the Textio portion of the analysis.

7) Results and Analysis

Content Analysis:

Several insights can be gleaned from the frequency analysis. Looking at the unsegmented data, both hard skills and soft skills (essential skills) were considered (Figure 3). Computer and Analytical skills were the most commonly asked for hard skills, with 30% of the total number of skill mentions being for Computer and Analytical skills. The ranking of hard skills mentioned (from most mentions to fewest) is as follows: Analytical (15%), Computer (15%), Planning/Organizing (11%), Oral Communication (7%), and Written Communication (4%).

The most frequent soft skill asked for in the unsegmented dataset were Interpersonal/Leadership skills, with 18% of all skill mentions being for Interpersonal/Leadership skills. The ranking of soft skills mentioned (from most to fewest) is as follows: Interpersonal/Leadership (18%), Entrepreneurial/Initiative (15%), Achievement (10%), Decision Making (4%), and Risk Taking (2%).

Several buzzwords were identified for the most desired KSAs by identifying which words were used most often to refer to those KSAs (Figure 7). For the Interpersonal/Leadership KSA, those words included “team,” “lead,” and “relationships.” For

Entrepreneurial/Initiative, “drive,” “deliver,” and “commit” were used to indicate the KSA. Words used in reference to Computer skills included “Microsoft Office” and “Microsoft Excel,” primarily. Lastly, Analytical skills were referenced using “develop,” “analytical,” “detail,” and “problem solving.” Students can use these buzzwords to better market themselves to potential employers on resumes, cover letters, and in interviews.

The segmented analysis was insightful, as well. The data were segmented by industry, as mentioned before, and there were several instances where one industry was shown to value a certain KSA more or less than the average (Figure 2). Among postings in the Aerospace industry, only 4% of skills asked for were for Oral Communication, which is more than one standard deviation from the mean of 8%. Similarly, the Aerospace industry was more than one standard deviation below the 5% average for Written communication.

Planning/Organizational skills accounted for 16% of the KSAs asked for in the Government/Nonprofit industry, three standard deviations above the mean of 10%; conversely, those skills were not mentioned as much for jobs in the Insurance industry, which was one standard deviation below the mean for this KSA.

In the Advertising industry, Analytical skills accounted for only 4% of KSAs mentioned, over two standard deviations below the mean of 10%.

Logistics posts had fewer mentions of Computer skills, falling one standard deviation below the 8% mean. In addition, posts in this industry did not emphasize Decision

Making skills as much, falling one standard deviation below the 5% mean. Government/Nonprofit postings, in contrast, emphasized Decision Making skills more than any other industry, with a 10% mention rate, over 2 standard deviations above the mean.

There was a high degree of variation with the Entrepreneurial/Initiative KSA. Logistics and Aerospace jobs both put a higher than average emphasis on this KSA, being one and two standard deviations above the mean, respectively. Government/Nonprofit jobs, on the other hand, fell almost three standard deviations below the mean for the Entrepreneurial/Initiative KSA.

There were several industries that focused more than others on Leadership/Interpersonal skills. Job postings in the Logistics, Insurance, and Advertising/Marketing industries were all one standard deviation above the mean of 20%.

Risk taking was shown to either be very slightly relevant, or not at emphasized in job postings across most industries. Posts in the Finance/Banking, IT, Professional Services, Retail/Wholesale, and Government/Nonprofit had no mentions of this skills at all. Advertising/Marketing had the most mentions, with 7% of the KSAs asked for being for this skill, which was two standard deviations above the 2% mean.

Lastly, Achievement was emphasized heavily in posts for jobs in the Professional Services, IT, and Finance/Banking industries, which all had mention rates one standard deviation above the mean of 13%. Posts in the logistics industry, by contrast, had a mention rate of only 11% for this skill, one standard deviation below the mean.

Textio Analysis:

Analysis revealed a slight female bias in the way that postings on FisherConnect are written, with 45% of postings having a feminine tone, as opposed to 26% with a masculine tone, and only 29% having no gender bias.

The algorithm also revealed several areas for improvement in the way that the posts were written, including format, language, syntax. Of the sample, 91% of postings were identified as needing more "we" and "you" statements. This type of language engages the reader and draws them in, and can help employers craft posts that stand out among others on posting sites.

The second most common area for improvement was for an Equal Opportunity Employer Statement—56% of the posts did not include one. EOE statements set the expectation that the firm is an inclusive and welcoming place, and have become increasingly important in recruiting. While firms may include this language in their other recruiting materials, many times a job posting is a potential recruit's first impression of the company, and as such it is beneficial to include statements that indicate that a firm is committed to diversity and inclusion.

Over half (55%) of the posts were identified to need more verbs. Active language and verbiage creates a more energetic tone that can excite readers more than passive language can.

Other areas that were noted for improvement include adding more bulleted content (identified in 42% of posts), eliminating passive language (17%), and removing words in all capital letters (11%).

8) Implications/ Future Research

These insights have implications to a variety of stakeholders identified above. Students can use the analysis of the KSAs most relevant across all industries and also specific to certain types of jobs to better tailor resumes, cover letters, and interview messaging to the specific KSAs employers are looking for.

University Administrators can share this information with students, too. There is potential for this information to be taken into consideration when designing curricula for undergraduate business programs.

Employers can use this information to be aware of the KSAs that are coming across in their postings and assess whether their postings are conveying the desired messaging. The suggestions contained in the Textio analysis can be used to improve the effectiveness of postings and differentiate their posts from the rest listed on FisherConnect.

A natural way to continue research on this topic would be to explore the monetary rewards assigned to certain skills. Research at the undergraduate level to quantify the impact of certain skills and attributes on salary, measured in dollar amounts, would be useful information to these stakeholders.

9) Lessons Learned

Although I learned many lessons while crafting and executing this project, three main takeaways stand out: the importance of iterating, operationalizing, and support systems. At many points throughout this project, I came across parts of my methodology that were either insufficient or infeasible given the data and resources I had. At those points, I was forced to reflect on the main goals of the projects and adapt my plan in a way that still allowed me to achieve my research objective. Ultimately, it was the flexibility in these moments that enabled me to continue and ultimately finish. That being said, it is almost impossible to retrace steps and keep track of changes without operationalizing every approach and aspect of the thesis. I realized quickly that writing down every methodology that I considered applying allowed me to keep track of changes, and better identify what did and didn't work. Finally, I realized that while a thesis can seem like a highly individual process, and is in many ways, that it takes the continued support and guidance of mentors, also. Without the time and effort that my advisors gave me throughout this process, I would not have been nearly as successful and I am very grateful for their help.

10) Timeline

- Data collection: End of October 2017
- Data cleaning: November 2017
- Indicator words compiled: Mid-October 2017
- Analysis completed: End of November 2017
- First draft completed: December 9, 2017
- Denman Undergraduate Research Forum: April 3, 2018
- Thesis Defense: April 4, 2018

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12) Appendix

Figure 1. Visual Representation of Project Components

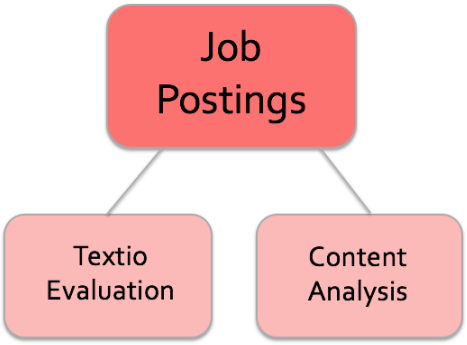

Figure 2. Employer Industries for Data Segmentation

Industry Sectors:

- Finance/ Banking
- IT
- Technology
- Advertising/Marketing
- Insurance
- Retail/Wholesale
- Consulting
- Government/ Nonprofit
- Aerospace
- Accounting
- Manufacturing
- Logistics

Figure 3. Breakdown of Hard and Soft Skills (adapted from Porter and McKibbin's 9 Skills and Personal Characteristics)

Hard Skills

- Oral communication
- Written communication
- Planning/Organizing
- Computer

- Analytical

Essential Skills:

- Decision making
- Entrepreneurial/Initiative
- Leadership/Interpersonal
- Risk taking
- Achievement

Figure 4. Indicator Words - Hard Skills

Oral Communication			Written Communication			Planning/Organizing			Computer			Analytical		
	Frequency Count	% of Total for this Skill		Frequency Count	% of Total for this Skill		Frequency Count	% of Total for this Skill		Frequency Count	% of Total for this Skill		Frequency Count	% of Total for this Skill
oral	81	12%	written	344	77%	Organization skills	10	1%	Microsoft Access	9	1%	problem-solv*	186	11%
verbal	269	38%	writing	104	23%	time management	89	8%	Microsoft*	88	5%	develop	572	35%
bilingual	15	2%				prioritize	77	7%	MS*	584	36%	attention	122	7%
listening	10	1%				plan*	401	34%	Microsoft Office	98	6%	detail*	207	13%
cold-call*	12	2%				effectively	154	13%	Excel*	496	31%	quality	185	11%
present*	245	35%				attention	122	10%	Powerpoint*	93	6%	analyt*	355	22%
spoken	5	1%				detail	207	18%	SAP	23	1%			
language	62	9%				organized	30	3%	technical	232	14%			
						organize	76	7%						

Figure 5. Indicator Words – Essential Skills

Decision Making			Entrepreneurial/Initiative			Interpersonal/ Leadership			Risk Taking			Achievement		
	Frequency Count	% of Total for this Skill		Frequency Count	% of Total for this Skill		Frequency Count	% of Total for this Skill		Frequency Count	% of Total for this Skill		Frequency Count	% of Total for this Skill
advise	36	9%	commit*	228	14%	interpersonal	155	8%	ambit*	78	46%	academic	237	21%
decision mak*	48	12%	self start*	46	3%	team	627	33%	risk taking	2	1%	achieve*	134	12%
consult*	149	38%	work ethic	62	4%	team player	29	2%	negotiat*	90	53%	results	145	13%
recommend	112	28%	network	186	12%	sincere	4	0%				focused	95	9%
judgement	7	2%	deliver	238	15%	relationships	321	17%				excel	496	45%
direction	42	11%	entrepreneur*	97	6%	listening	10	1%						
			initiative	134	8%	joint	5	0%						
			curios*	23	1%	negotiat*	90	5%						
			curious	31	2%	manager	175	9%						
			sense of urgency	7	0%	conflict	12	1%						
			drive*	323	20%	leader*	451	24%						
			independent*	213	13%									
			proactive	27	2%									

Figure 6. Stopwords Applied to Voyer Analysis

!	2018	63	\]	both	found	less	others	thee	what
$	2019	64	\^	bottom	four	ltd	otherwise	their	whatever
%	2020	65	\{	but	from	m	our	them	when
&	21	66	\}	by	front	made	ours	themselves	whence
-	22	67	a	c	full	many	ourselves	then	whenever
.	23	68	about	call	further	may	out	thence	where
0	24	69	above	cannot	g	me	over	there	whereafter
1	25	7	across	con	get	meanwhile	own	thereafter	whereas
10	26	70	after	couldnt	give	might	p	thereby	whereby
100	27	71	afterwards	d	go	mill	part	therefore	wherein
11	28	72	again	de	h	mine	per	therein	whereupon
12	29	73	against	did	had	more	perhaps	thereupon	wherever
13	3	74	all	didn't	has	moreover	please	these	whether
14	30	75	almost	doesn't	hasnt	most	put	they	which
15	31	76	alone	don't	have	mostly	q	thing	while
16	32	77	along	done	he	move	r	third	whither
17	33	78	already	down	hence	much	rather	this	who
18	34	8	also	due	her	must	re	those	whoever
19	35	80	although	during	here	my	s	thou	whole
1990	36	81	always	e	hereafter	myself	same	though	whom
1991	37	82	am	each	hereby	n	see	three	whose
1992	38	83	among	eg	herein	name	seem	through	why
1993	39	84	amongst	eight	hereupon	namely	seemed	throughout	will
1994	4	85	amoungst	either	hers	neither	seeming	thru	with
1995	40	86	amount	eleven	herself	never	seems	thus	within
1996	41	87	an	else	him	nevertheless	serious	thy	without
1997	42	88	and	elsewhere	himself	next	several	to	would
1998	43	89	another	enough	his	nine	she	together	x
1999	44	9	any	etc	how	no	should	too	y
2	45	90	anyhow	even	however	nobody	since	toward	yet
20	46	91	anyone	ever	hundred	none	six	towards	you
2000	47	92	anything	every	i	noone	sixty	twelve	your
2001	48	93	anyway	everyone	ie	nor	so	twenty	yours
2002	49	94	anywhere	everything	if	not	some	two	yourself
2003	5	95	are	everywhere	in	nothing	somehow	u	yourselves
2004	50	96	around	except	inc	now	someone	un	z
2005	51	97	as	f	indeed	nowhere	something	under	|
2006	52	98	at	few	into	o	sometime	until	
2007	53	99	b	fifteen	is	of	sometimes	up	
2008	54	:	back	fify	it	off	somewhere	upon	
2009	55	;	be	fill	its	often	still	us	
2010	56	<	because	find	itself	on	such	v	
2011	57	>	been	fire	j	once	system	very	
2012	58	@	before	first	k	one	t	via	
2013	59	\(	beforehand	five	keep	only	take	w	
2014	6	\)	being	for	l	onto	ten	was	
2015	60	*	beside	former	last	or	than	we	
2016	61	\+	besides	formerly	latter	other	that	well	
2017	62	\?	between	forty	latterly	least	the	were	

Figure 7. Buzzwords Associated with Most Asked-For KSAs